

**Annual Report
of
Accomplishments and Results**

March 01, 2002

*Plan of Work for Agricultural Research
and
Extension Formula Funds (AREERA)*

2000-2004

**Charles C. Muscoplat, Director
University of Minnesota
Agricultural Experiment Station**

Table of Contents

<u>Executive Summary</u>	2
<u>Descriptions of Planned Programs by Key Themes</u>	5
<u>Key Theme: Agricultural Profitability/Productivity (Research)</u>	5
<u>Key Theme: Animal Health (Research)</u>	7
<u>Key Theme: Plant Genomics (Research)</u>	9
<u>Key Theme: Ornamental/Green Agriculture (Research)</u>	10
<u>Key Theme: Food Quality (EXTENSION), Food Safety (JOINT)</u>	12
<u>Key Theme: Human Nutrition (Joint)</u>	13
<u>Key Theme: Forest Resource Management (Research)</u>	15
<u>Key Theme: Integrated Pest Management (Research)</u>	17
<u>Key Theme: Water Quality (Research)</u>	19
<u>Key Theme: Agricultural Waste Management (Joint)</u>	20
<u>Key Theme: Rural Communities (Joint)</u>	21
<u>Report on the stakeholder input process</u>	24
<u>Update, if applicable, on the program review processes</u>	26
<u>Evaluation of the success of multistate, multi-institution, and multidisciplinary activities, and joint research and extension activities</u>	27
<u>Evaluation of the Success of Multi and Joint Activities</u>	29
<u>Reporting requirement for integrated research and extension activities, including Form CSREES – REPT (2/00)</u>	30
<u>FY 2001 FACULTY WITH JOINT APPOINTMENTS (RESEARCH/EXTENSION)</u>	31
<u>Financial Data</u>	34

Executive Summary

Goal 1. Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing. (An agricultural system that is highly competitive in the global economy.)

Goal 1 in the 2000-2004 Plan of Work comprises the following programs: Agricultural Production and Farm Business Management, Agricultural Marketing and Distribution, International Economic Competitiveness, Physiological Processes Impacting Production and Quality Traits in Agricultural Animals, Animal Production and Management Strategies, Genetic Enhancements in Animal Systems, Understanding Physiological Processes Impacting Production and Quality Traits in Cropping Systems, Genetic Enhancement in Plant Production Systems, Crop Production and Management Strategies, Value Added Agriculture, Green Industry, Food Crops, and Agricultural Information Technology.

The “Key Themes” section of this report details extension and/or research results supported with agricultural research and extension formula funds, highlights successes, and documents benefits to clientele and stakeholders.

Total Expenditures by Source of Funding

Hatch - \$577, 850; MRF - \$90,278; State - \$4,877,686; Other Federal - \$264, 985; Other Non-Federal - \$1,327,630

Total (Experiment Station only): \$7,138,429

FTEs (Experiment Station only): 87.8

Goal 2. To ensure an adequate food and fiber supply and food safety through improved science based detection, surveillance, prevention, and education. (A safe and secure food and fiber system.)

Safety of the food we eat is of intense concern to people everywhere, and is a complex and important issue attracting efforts of the Minnesota Agricultural Experiment Station and the University of Minnesota Extension Service. The federal government has mandated increased sanitation training and stricter controls for parts of the food processing industry, creating a training component addressable by Extension. New methods are being created by Experiment Station researchers for detecting and reducing food-borne pathogens on the products being processed and marketed, be they fresh produce, dairy and poultry products, or meats.

The “Key Themes” section of this report details extension and/or research results supported with agricultural research and extension formula funds, highlights successes, and documents benefits to clientele and stakeholders.

Total Expenditures by Source of Funding

Hatch - \$54,806; State - \$138,715; Other Federal - \$43,918; Other Non-Federal - \$1801; Smith-Lever 3b&c – \$116,865

Total: \$356,105

FTEs: 4.8

Goal 3. Through research and education on nutrition and development of more nutritious foods, enable people to make health-promoting choices. (A healthy, well-nourished population.)

Americans are simultaneously obsessed with physical appearance yet beset with poor eating habits that lead to obesity and/or insufficient nutrition, and which may also contribute to disease. Educating people to make appropriate and nutritious food choices is a focus of important University of Minnesota Extension Service programming. While current information is applied to these educational efforts, the Minnesota Agricultural Experiment Station funds several areas of research that push the boundaries of our current knowledge base on healthy, life sustaining nutrition.

The “Key Themes” section of this report details extension and/or research results supported with agricultural research and extension formula funds, highlights successes, and documents benefits to clientele and stakeholders.

Total Expenditures by Source of Funding

Hatch - \$29,664; Special/Competitive - \$53,003; State - \$432,372; Other Federal - \$138,504; Other Non-Federal - \$218,006; Smith-Lever 3b&c - \$135,563

Total: \$1,007,112

FTE: 13.2

Goal 4. Enhance the quality of the environment through better understanding of and building on agriculture’s and forestry’s complex links and with soil, water, air and biotic resources. (An agricultural system that protects natural resources the environment.)

The programs under Goal 4 in the 2000-2004 Plan of Work include: Maintaining Forest and Natural Resources, Integrated Pest Management, Increasing and Maintaining Diversity in Agricultural Systems, Sustainable Agriculture, Water Resource Management, and Animal Waste Management.

The “Key Themes” section of this report details extension and/or research results supported with agricultural research and extension formula funds, highlights successes, and documents benefits to clientele and stakeholders.

Total Expenditures by Source of Funding

Hatch - \$374,799; MRF - \$203,389; Animal Health - \$26,954; Special/Competitive - \$148,438; State - \$5,586,034; Other Federal - \$2,162,536; Other Non-Federal - \$2,763,191; Smith-Lever 3b&c - \$23,396

Total: \$11,557,919

FTEs: 71.6

Goal 5. Empower people and communities, through research-based information and education, to address the economic and social challenges facing our youth, families, and communities. (Enhanced economic opportunity and quality of life for Americans)

The Minnesota Agricultural Experiment Station and the University of Minnesota Extension Service each view the development and implementation of information technologies to be critical to the economic, social and environmental well being of Minnesota's rural communities. Information technologies can support the sustainability of rural farm lifestyles. For example, one specific technology-precision agriculture project offers both economic benefits of reducing crop inputs and water quality benefits by avoiding excess soil amendments.

The "Key Themes" section of this report details extension and/or research results supported with agricultural research and extension formula funds, highlights successes, and documents benefits to clientele and stakeholders.

Total Expenditures by Source of Funding

Hatch - \$51,586; MRF - \$991; State - \$101,037; Other Non-Federal – \$70,123; Smith-Lever 3b&c – \$98,818

Total: \$322,555

FTEs 11.3

Descriptions of Planned Programs by Key Themes

Key Theme: Agricultural Profitability/Productivity (Research)

AES Plan of Work: Goal 1 – Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing. (An agricultural system that is highly competitive in the global economy.)

Program 1: Agricultural Production and Farm Business Management

Program 2: Agricultural Marketing and Distribution

Program 5: Animal Production and Management Strategies

Program 9: Crop Production and Management Strategies

Program 13: Agricultural Information Technology

a. Description

Minnesota Agricultural Experiment Station supported research addressing farm productivity and profitability covers a wide range, from improving on-farm production, to farm financial management considerations, to marketing and transportation of the crops and livestock produced. Nearly any research on crops and livestock could be said to address farm productivity: genetic improvements increase yields per dollar invested, disease control reduces loss, diversification insulates against market fluctuation, etc. But some research can tie to a more specific focus.

b. Impact

Several projects directly address crop production. Investment in tile drainage has in the past been haphazardly evaluated in northern Minnesota. A research effort is systematically examining the economic feasibility of subsurface drainage for a typical crop rotation found in the unique climate, soils and landscapes of the northwest region of Minnesota. Excessive subsoil moisture has reduced yield potential by as much as 30 percent below theoretically attainable yields, a negative regional impact of \$20.3 million.

The potential loss of pasture grazing systems is viewed as inevitable in many areas due to the contamination of water resources being caused by runoff carrying excess nutrients from fields. Such land uses are currently exempt from environmental regulations, but this is expected to change. Because such a change threatens the livelihood of grazing based livestock systems in West Central Minnesota, runoff is being measured with alternative winter bedding systems to develop recommendations for effectively sequestering runoff after rainfalls, and to guide future rule revisions.

Precision agriculture is being evaluated as a means to reduce the amount of purchased fertilizer needed for a crop. Spreader tests in Blue Earth County have shown that typically available equipment misses optimum application rates by as much as 50 percent, and are especially problematic in areas needing low application rates. Standard available sensors

for measuring actual harvests from precise areas of fields also lack reliability. More responsive sensors have been developed and their accuracy is being evaluated.

Waves of farm bankruptcies and liquidations have been occurring in important farm regions. Rooted in basic management and economic aspects of running a farm business, understanding why one farm in the Red River Valley region of Minnesota fails next door to another that is successful is a research focus. An overall evaluation of what it takes to be successful farming there is underway. It seeks to identify the set of farm characteristics and adaptive farm management responses that contribute to improving the probability of farm survival. It will identify the set of farm characteristics and adaptive farm management responses that have contributed to improving probability of farm survival, and disseminate that knowledge widely across the area. Another project looks at risk management decisions and adaptive responses to changing market decisions by farmers and lenders. Computerized decision aids are helping lenders and farmers both evaluate financial decisions and improve farm survivability.

A separate project is examining how the dominance of corn-soybean crop rotations in the region has increased both economic and environmental risk. A project in applied economics is identifying and interpreting the complex forces affecting existing farm financial performance, and evaluating potential alternatives that could lead to improved viability. The success of this project will potentially impact all of Minnesota's 85,000 farmers, as well as the communities and business that form the rural economic infrastructure.

Economic analysis of livestock is examined with respect to the recent collapse of hog prices across the U.S. livestock markets. The volatility exhibited by that market caused \$4 billion of equity losses to the nation's pork producers. Research is evaluating fixed production costs, estimated demand, the potential for price control being exercised by processors, impacts of foreign demand, and other factors in order to provide better management strategies for producers in coping with market uncertainties.

An agricultural transportation database is being developed in cooperation with a consortium of agricultural and rural organizations to support agricultural development efforts. This has already been used to validate the economic viability of a \$6 million investment, with additional federal loans expected, to rehabilitate tracks and reopen the Minnesota Valley Railroad. Elevator operators pursuing exports of grains and soybeans to Mexico have also relied on the database to demonstrate feasibility.

Experiment Station Projects: MIN-12-028; MIN-14-022; MIN-14-052; MIN-14-056; MIN-14-057

<http://www.rapidresponse.umn.edu/grazingsystems/grazingsystems2001-topic.html>

<http://www.rapidresponse.umn.edu/drainage/drainage2001-topic.html>

<http://www.rapidresponse.umn.edu/farmfamily/farmsurvival2001-topic.html>

- c. Funding: Hatch and State
- d. Scope of Impact: (1) State Specific

Key Theme: Animal Health (Research)

AES Plan of Work: Goal 1

Program 4: Physiological Processes Impacting Production and Quality Traits in Agricultural Animals

Program 5: Animal Production and Management Strategies

a. Description

With respect to the allocation of Minnesota Agricultural Experiment Station resources, animal health in Minnesota is most intensively focused on the prevention or eradication of a number of livestock diseases, some of genetic and others of viral cause. There are about 40,000 livestock producers in Minnesota, with poultry, cattle and hogs numerically and financially most significant. Cattle, hogs and poultry each represent significant economic sectors of Minnesota's livestock production industry, and each has at least one major health condition retarding successful production and receiving research attention.

b. Impact

Minnesota, one of the two largest turkey producing states in the U.S. (part of a \$1 billion state poultry industry employing more than 25,000 people), is battling the spread of avian pneumovirus (APV, which is caused by more than one virus isolate, similar to how there is more than one human flu virus) and other respiratory viruses of turkeys. Because numerous wild bird species are found to be natural repositories of APV, prevention has focused on creation of an effective vaccine, and significant progress has been made towards that end. Candidate vaccines have been developed under laboratory conditions. Additional studies on the wild bird vectors are also underway.

Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) is the world's most significant infectious hog disease, costing the industry hundreds of millions of dollars since first identified in the 1980s. It can cost a producer up to \$500 per sow per year in productivity, and also excludes breeding stock farmers with infected animals in their herds from selling to trade markets. Up to 75 percent of all Minnesota and U.S. herds are infected with it. A test and removal protocol has been developed and successfully tested on five Minnesota farms that have remained free of the disease over a year of monitoring, and the protocol is expected to spread quickly through the industry worldwide.

Dairy and beef cattle have several health problems that attract the efforts of Experiment Station researchers. Johne's (pronounced Yo-knees) disease in dairy herds causes economic loss of up to \$200 per cow from reduced milk production and shortened cow life spans. The

causative bacteria is also implicated as a contributor to human Crohn's Syndrome, as it appears able to occasionally survive milk pasteurization. Its epidemiology is being studied and alternative herd management practices evaluated to develop effective tests for detecting infected animals and to identify management practices to control its spread.

Each year, U.S. dairy farmers lose \$1 billion to mastitis, an infection of the udder -- about half of all milking cows will have mastitis at some point in their lives, and the most productive cows appear to be most susceptible. Minnesota research has produced an evaluation process that tests for early indicators of potential mastitis. This has led to the development of a national index ranking cows and bulls for their susceptibility, enabling the breeding of healthier cows. Within five years, these efforts are expected to have populated dairy cow herds with healthier and more productive cows producing higher quality milk with lower likelihood of antibiotic residues because of reduced needs for mastitis treatments.

Protocols are also being developed for creating "best management practices" assuring safe and proper use of antibiotics and medical treatments of dairy cows to prevent contamination of milk or development of resistant pathogens.

And research is underway to develop preventive protocols and treatments for bovine respiratory disease, an economically important disease condition affecting beef and dairy cattle. Investigators have already linked its cause to a toxin that affects bovine white blood cells. Developing an effective block to this process will reduce the use of antibiotics in dairy calves and feedlot cattle.

Experiment Station Projects: MIN-16-028; MIN-16-047; MIN-17-023; MIN-60-009; MIN-60-015; MIN-62-037; MIN-62-042; MIN-62-043; MIN-63-032; MIN-63-060; MIN-63-062

<http://www.rapidresponse.umn.edu/avian/avian2001-topic.html>

<http://www.rapidresponse.umn.edu/dairy/Johnesdisease2001-topic.html>

<http://www.rapidresponse.umn.edu/dairy/Johnesidentify2002-topic.html>

<http://www.rapidresponse.umn.edu/dairy/Johnesresistance2002-topic.html>

<http://www.rapidresponse.umn.edu/dairy/dairydrugs2002-topic.html>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=180>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1534>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1953>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1952>

- c. Funding: Hatch and State
- d. Scope of Impact: Integrated Research and Extension

Key Theme: Plant Genomics (Research)

AES Plan of Work: Goal 1

- Program 7: Understanding physiological processes impacting production and quality traits in cropping systems
- Program 8: Genetic enhancement in plant production systems

a. Description

Wheat and barley are a billion-dollar business in Northwest Minnesota. The problems scab presents for Minnesota wheat and barely producers include an accumulated economic loss of \$2 billion since 1993. The blight can affect both yield and quality in both crops, though it is more apt to cause barley to lose quality. This quality loss is extremely important as most barley is used for malting, and poor quality barley cannot be malted. Traditionally, up to 80 percent of barley grown in the northwest had been sold for malting but scab lowered it to less than 20 percent over the past few years. Scientists have made progress against scab using conventional and new genetic research.

Another crop under genomic scrutiny is the potato. The potato is the leading U.S. vegetable from the standpoint of consumption, nutrition and farm value. On a national basis, 18 billions pounds of potatoes are processed into chips and fries with an economic value of \$1.1 billion. Approximately 3.6 billion pounds of potatoes are rejected at processing plants due to free reducing sugar accumulation that accompanies temperature related stresses during storage. The concentration of reducing sugar in raw potatoes is the most important factor that limits product quality of chips and fries. The goal of researchers is to develop a potato that will not sweeten in the cold. Advantages would be less shrinkage, less disease, extended marketability, reduced heating costs and eliminating the need to apply chemical sprout inhibitor. A better understanding of the mechanisms regulating starch-sugar conversion at the molecular level is necessary before it is possible to successfully produce potatoes with the proper genetic background to resist sweetening when placed into cold temperatures.

b. Impact

Over the past five years scientists have evaluated over 10,000 barley lines for resistance to scab. In the last several years, based on scab field screening data of 14 spring wheat cultivars evaluated in Minnesota nurseries, the U of M has established more effective and efficient ways to test lines for scab resistance. The data showed that for initial evaluations, susceptible material could be reliably identified and discarded based on data from two replicates in three environments. Researchers have identified the location in the barley genome of genes for resistance to scab. They have marked these locations, and the barley breeding project is now using these molecular markers to incorporate these regions carrying resistance into elite barley cultivars. The first barley variety in the Upper Midwest to have a useful level of scab resistance was released by this project in 1998. Varieties developed by the program are grown in neighboring states and in the prairie provinces of

Canada. A spring wheat variety has been produced from the accelerated scab breeding effort. It is one of the first new varieties that doesn't sacrifice yield for better scab tolerance.

Research into the cold sweetening problem of potatoes has had these impacts: Scientists have 1) Described the role of the enzyme sucrose synthesis as a marker for chemical maturity of potatoes; 2) Purified and characterized the major enzyme controlling starch synthesis in potatoes; 3) Developed a simple and rapid method to assay for starch in potato tissue; 4) Developed a chemical maturity monitoring technique to measure the maturity and storage requirement for chipping and fry potatoes that is being used by the major potato processors; 5) Identified a gene that is present in cold-sweetening resistance potatoes; and 6) Screened for an anti-sweetening gene in breeding populations.

Experiment Station Projects: MIN-21-066, MIN-13-030, MIN-21-019

www.extension.umn.edu/mnimpacts/impact.asp?projectID=1539

www.rapidresponse.umn.edu

www.extension.umn.edu/mnimpacts/impact.asp?projectID=2049

- c. Funding: Hatch and State
- d. Scope of Impact: Multistate Research

Key Theme: Ornamental/Green Agriculture (Research)

AES Plan of Work: Goal 1

Program 11: Green Industry

- a. Description

Minnesota nurseries are continuously looking for ways to improve their productivity with environmentally friendly methods. Green industry businesses are often hampered by slow growth of some of their products. Since crop turnover is directly related to profitability, the nursery industry would like slow growers, such as magnolias and oaks, to mature faster in order to allow for greater returns. Research has focused on increasing the productivity and environmental friendliness of the nursery industry in Minnesota and the rest of the country.

At present, only a few states have fruit breeding programs, and the one at the University of Minnesota is the last major program in the Midwest. Minnesota also produces difficult conditions for growing fruit. The goal of the breeding program is to develop cultivars that will survive and bear fruit regularly at commercially profitable levels under challenging climatic conditions. The Minnesota fruit breeding project is comprehensive, with substantial efforts in apple, wine and seedless grape, blueberry, strawberry, and raspberry development. In addition there are small programs to develop blackberries, crisp-fleshed pears, apricots, black currants, and other less common fruits for adaptation to the Minnesota climate.

Basic research focused on green agriculture has shown results related to on the molecular analysis of floral gene expression. The goals of this work are to elucidate the mechanisms that control flower-specific gene expression and then to apply this understanding toward improving horticultural crops.

b. Impact

Research has determined that, in general, more phosphorous is being used in the nursery industry than is necessary to help plants grow faster.

Other research on the impact of temperature and light on flowering is being used to effectively schedule flowering of greater than 60 greenhouse crop species. Experimental results have resulted in decreased production costs by hastening flowering, increasing the crop rotation number that a greenhouse can produce, and increased crop quality. In addition, results allow greenhouse producers to deliver supplemental lighting only to those species that will benefit. The results have helped reduce production time at local commercial greenhouses in Minnesota, to produce seedlings for export. The work affects the entire greenhouse industry in Minnesota. In addition, recent work on greenhouse vegetable production is having a positive impact on a rapidly growing Minnesota greenhouse vegetable industry. Decreasing crop time by 25 percent can translate into an increase of profit of at least 20 percent per year (an additional crop rotation in spring.) Findings of the research also dramatically increase the predictability in flowering that improves quality and marketability of product.

Over the past century the fruit breeding program has produced dozens of new fruit cultivars. In 1996 Frontenac grapes were introduced for red wine production. This has made possible a recent expansion of Minnesota's wine industry. Now, a new grape variety is showing promise for white wine production in Minnesota. The entire Minnesota fruit-growing industry represents tens of millions of dollars in income for growers. Minnesota research has successfully aided in boosting production of various fruits. For example, a 1999 apple tree survey from the USDA Statistic Service said that over 80,000 Honeycrisp apple trees have been planted in Minnesota alone since 1990, with 945,000 being planted across the U.S. In their lifetime, each of these trees will produce at least 40 bushels of apples. With a conservative average price estimate of \$25 per bushel, this represents a gross income of approximately \$1,000 per tree.

In basic research, scientists have identified and characterized a number of genes expressed only in flowers. These flower-specific genes are used as tools to understand and then manipulate the formation of pollen and ovules. A very important discovery in the research has been the identification of specific DNA regions that are contained in the flower-specific genes. This discovery is a first step in determining how flower production is controlled and allows for the use of their DNA for the manipulation of plant reproduction. Targeting gene activity to specific floral tissues without affecting other portions of the flower is a very powerful tool for basic and applied studies.

Experiment Station Projects: MIN-21-060, 21-050, 21-055, 21-064

<http://florifacts.umn.edu>

www.extension.umn.edu/mnimpacts/impact.asp?ProjectID=1501

www.extension.umn.edu/mnimpacts/impact.asp?ProjectID=1485

- c. Funding: Hatch and State
- d. Scope of Impact: (1) State specific

Key Theme: Food Quality (EXTENSION), Food Safety (JOINT)

AES Plan of Work:

Goal 2: To ensure an adequate food and fiber supply and food safety through improved science-based detection, surveillance, prevention, and education.

Extension Plan of Work:

Goal 2: A Safe and Secure Food and Fiber System

- a. Description

The quality and the safety of the food we eat are of intense concern to people everywhere. Food-borne infections cause 6.5 to 33 million illnesses and thousands of deaths in the U. S. every year. Estimated medical costs and productivity losses from illnesses and deaths range from \$6 to \$34 billion annually. The federal government has mandated increased sanitation training and stricter controls for parts of the food processing industry, creating a training component that Extension addresses. New methods are being originated by Experiment Station researchers for detecting and reducing food-borne pathogens on the products being processed and marketed, fresh produce, dairy and poultry products, or meats.

Researchers in Minnesota are developing a rapid technique to identify all strains in a single diagnosis of Salmonella and *E. Coli*, two of the most common pathogens causing food-borne illnesses, at an early stage in the production of eggs, milk, and meat. Another key project is examining the use of natural disease-fighting phenolic compounds found in edible plants like parsley, citrus fruits, hazelnuts, and grain flours, as well as naturally-occurring anti-microbial bacteria associated with foods. Other research is focused on the effect of freezing unpasteurized fruit juices to improve safety and nutritional quality.

b. Impact

Extension programs deliver research-based information to both food industry and consumer audiences. Industry training programs provide commercial thermal processing and new food entrepreneur education, food safety/HACCP for food processors, and food manager certification in food safety/food handling. The ServSafe program for food handling businesses trained over 600 managers and food handlers during 2000-01. They, in turn, reported training another 455 employees. All of those trained reported adopting one or more improved practices as a result of the training, e.g., improved temperature control, cooling and reheating, food storage, cleaning and sanitation, and personal hygiene. Consumer food safety programs were provided for youth, adults, and the elderly. Practices such as hand washing, proper food storage, keeping refrigerators at correct temperatures, and keeping food preparation surfaces clean and sanitary were emphasized. Pre and post tests indicated that nearly all participants increased their knowledge of food safety and adopted one or more food-safe food handling and storage practices in their own homes. Milk Quality Assurance training resulted in reductions of 300,000 to 400,000 in somatic cell counts on 325 dairy farms. More than 600 livestock producers and nearly 500 youth completed quality assurance training and were certified.

The long-term impact of this research and these educational programs will be reductions in the number of food-borne illnesses and resulting deaths and in medical costs and productivity losses.

Experiment Station Projects: MIN-18-042, MIN-18-054

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=385>

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=123>

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=256>

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=88>

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=182>

- c. Source of federal funding: Hatch and Smith-Lever 3b&c.
- d. Scope of Impact: Integrated research and Extension and multi-state Extension. (AR, CA, FL, IA, IN, KS, NC, OH, PA, SD, TX, WA, WI)

Key Theme: Human Nutrition (Joint)

AES Plan of Work:

Goal 3: Through research and education on nutrition and development of more nutritious foods, enable people to health promoting choices.

Extension Plan of Work:

Goal 3: A healthy, well-nourished population

a. Description

Americans are simultaneously obsessed with physical appearance yet beset with poor eating habits that lead to obesity and/or insufficient nutrition and also likely contribute to human disease. Educating people to make appropriate and nutritious food choices is an important focus of University of Minnesota Extension Service programming. The Minnesota Agricultural Experiment Station provides current information for these educational efforts and funds several areas of research that push the boundaries of our current knowledge base on healthy, life sustaining nutrition.

MAES research is investigating the use of nutraceuticals—fiber and antioxidant-enriched foods--in healthy diets. Other investigators are looking at increasing dietary fiber intake in the form of whole grains, fruits and vegetables and examining the dietary patterns and socio-environmental factors influencing dietary patterns in urban, low-income, minority families. And another researcher is exploring the possibility of dietary prevention of hormone-dependent cancers.

b. Impact

Significant Extension effort was made during 2000-01 to promote healthful eating among several significant population segments: Seniors, diabetics, adults, parents, child care providers, Native Americans, young children, pre-teens, low-income families, new immigrants, etc. Significant changes in program participants' behavior were reported, e.g., 87% of a group of 94 parents indicated that they planned to change how they feed their children. Those with infants and young children learned when to start solid foods, what foods to start, how to prepare foods safely for infants and toddlers, and who to do if their child is choking. Fifth graders in nutrition groups increased the servings of fruits and vegetables eaten and the amount of milk they drank to recommended levels and exercised daily. 57% of them set goals for choosing nutritious foods and snacks that were met by the end of the program. Seniors living alone or in small households were taught how to plan nutritious meals using more fruits and vegetables. When contacted later, nearly all of them reported that they were using the nutrition information and drinking more water, as well as exercising regularly for greater flexibility. Over half of the adults that completed a five-week "McFITNESS" program in one county reported afterwards that they were eating the recommended servings of fruits and vegetables, drinking 8 glasses of water daily, and exercising regularly. Using soy as a source of protein was emphasized in several nutrition education programs. 86% of the participants reported buying and using soy products, trying soy recipes, and using soymilk for cooking and drinking. Nutrition programs for Native Americans emphasized using traditional foods in a healthful diet and growing their own vegetables, which also provides healthful exercise. One program, "Woodlands Wisdom," is also providing assistance in establishing academic programs in food and nutrition at six Tribal Colleges in Minnesota and Wisconsin.

The long-term impact of this research and these Extension programs is improved health, longevity, and productivity and reduced costs of medical care and loss of productivity.

References:

AES Research Projects: MIN-18-023, MIN-54-026, MIN-54-029, MIN-54-034, MIN-54-059, MIN-54-064, MIN-54-G05

<http://www.extension.umn.edu/listing.html?topic=9&subcat=68>

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=1523>

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=1549>

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=1490>

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=1547>

- c. Source of Federal Funding: Hatch and Smith-Lever 3b&c
- d. Scope of Impact: Integrated Research and Extension and Multi-State Extension (IA, ID, MO, ND, WI)

Key Theme: Forest Resource Management (Research)

AES Plan of Work:

Goal 4 - Enhance the quality of the environment through better understanding of building on agriculture's and forestry's complex links with soil, water, air and biotic resources.

Program 1: Maintaining Forest and Natural Resources

a. Description

Our forests are inviting natural recreational environments, economically important timber production resources, essential land and wildlife conservation mechanisms, and even climate moderating planetary features. They exist within complex webs of interrelated and competing land use demands. Priorities for the use of specific forests or tree stands are impacted by ownership, proximity to public resources like lakes and streams, age and type of timber, needs to conserve marginal soils, preservation of wildlife habitat or larger ecosystems, etc. Maintaining forest related industries such as logging and tourism involves billions of dollars of calculable economic impact. Conservation of our natural environment is additional incalculable value.

b. Impact

Integrating competing demands on forests is a key focus for Minnesota Agricultural Experiment Station funded activities. Supported research focuses on the balance between competing demands, and on maintenance of the forests, their productivity and the environment. Their impacts range from local to global.

How technologies address maintenance of our forests is being captured in a project monitoring change in Minnesota natural resources through satellite imagery. Techniques developed by this project allow the U.S. Forest Service and the Minnesota Department of Natural Resources to update forest inventories at four year intervals, compared to the fifteen year frequency previously dictated by the costs of conducting ground based inventories. Other computer software, Mapserver, enables ecosystem visualizations to be delivered across the internet on demand, eliminating costs and time delays formerly encountered producing and distributing CD image databases to remote offices of the Minnesota DNR, and to individuals, furthering NASA's goal of finding non-military uses for satellite imagery.

A number of projects attack the question of forest sustainability under harvesting pressure. Many of these projects address the conditions needed to keep Minnesota's timber products industries healthy over the long term, sustaining an economic sector that employs 60,000 people and generates up to \$8 billion of economic value annually. These projects variously: clarify exactly how much forest regeneration constitutes sustainability in conjunction with the current annual timber harvest of 200,000 acres; quantify how private land owners can economically fill short-term timber shortfalls with plantings that will enable 20,000 acre annual harvests in 10 years; identify how harvests could be arranged spatially to maintain high timber production levels in places like Chippewa National Forest while maintaining environmental balance sustaining wildlife habitat, water management, etc.; and develop genetically improved trees that with increased growth rates, as well as resistance to diseases that will allow species such as eastern white pine, nearly written off as a viable commercial species in Minnesota, to be replanted as a major component of northern forests.

Two other forest management research projects address worldwide concerns. One seeks to create valuations for environmental goods and services. This will enable better national evaluations of the long-term costs versus short-term gains of deforestation through overharvests and burning, valuations that could include concrete elements such as recreational uses (such as eco-tourism) and forest product harvests (bioprospecting, selected timbers, nuts), as well as more esoteric environmental issues such as erosion control, ecological integrity and carbon sequestering. The other is assembling databases and developing explicit models for predicting forest carbon cycling and overall forest productivity (including twigs, leaves, fruit, organic compounds and wood) in order to more accurately project the production capacity of a forest based on its particular spatial and environmental variable (soil type, forest structure, age, species, temperature, precipitation, physiological processes such as photosynthesis and respiration, etc.).

Experiment Station Projects: MIN-14-077; MIN-17-018; MIN-17-070; MIN-40-015; MIN-41-033; MIN-41-036; MIN-42-020; MIN-42-022; MIN-42-032; MIN-42-040; MIN-42-042; MIN-42-044; MIN-42-045; MIN-42-046; MIN-42-049; MIN-42-070; MIN-42-086; MIN-42-089

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1480>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1495>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1552>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1790>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1412>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1368>
<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1511>
<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=102>
<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1950>
<http://www.cnr.umn.edu/FR/geninfo/report98-99/index.html> - reslist

- c. Funding: Hatch and State
- d. Scope of Impact: (1) State Specific Experiment Station Research

Key Theme: Integrated Pest Management (Research)

AES Plans of Work: Goal 4

Program 2, Integrated Pest Management

- a. Description

Integrated Pest Management (IPM) is an array of techniques and technologies aimed at improving, through integration of chemicals, genetic resistance, new technologies, natural enemies and crop management techniques, the control of noxious native and foreign weeds, and insect pests in crops, landscapes and the natural environment. IPM can potentially save agricultural producers money; reduce the amounts of chemicals applied to our environment; increase plant, insect and animal diversity in the landscape; slow the evolution of resistant pests, control aggressive non-native invaders; and reduce populations of disease transmitting insects.

- b. Impact

Microbial pests, insects such as corn borers, disease carrying aphids and yield reducing weeds all reduce the income per acre achieved by agricultural producers, sometimes drastically. In recent past decades this has led to escalations in the application of a chemical arsenal that we have come to recognize is losing its effectiveness against increasingly resistant pests, while simultaneously polluting our surface and ground waters, the soil, and even the food we eat. There have also be numerous documented instances of negative impacts on wildlife. Basic and applied Minnesota Agricultural Experiment Station sponsored research addresses many of these problems.

Control of the European Corn Borer and other stalk boring insects is important to Minnesota agriculture. They cost U.S. corn growers more than \$1 billion annually. Large numbers of Minnesota's farmers grow corn for cash in rotation with soybeans and as feed for livestock such as hogs and dairy cows, which are also important components of Minnesota's agricultural sector. Basic research is underway on the ecology and management of stalk borers with the goal to improve biological controls. Its findings impact the income of thousands of farmers, crop consultants, and seed developers and sellers.

Evaluation of Bt corn against the corn borer and the corn rootworm is also underway, to enable farmers to use costly chemical controls more efficiently and safely. Results from this project are being used by the Environmental Protection Agency in its formulation and evaluation of regulatory policy for managing corn borer resistance to Bt corn. Estimates of likely yield loss, based on historic frequency and severity are being developed to enable producers to evaluate their control options.

Management of insect pests of potatoes, including those that are carriers of pathogens, continues to attract research activity on pesticide application timing, to reduce the frequency of chemical use, particularly by seed potato growers, which are currently losing as much as half their crop to excessive aphid transmitted viruses. Currently about 12,000 Red River Valley acres are able to grow certified seed potato, down 40 percent from historic levels. As the controls being developed take effect, regain of this lost market share is expected.

Vegetable crops are also addressed by Experiment Station sponsored research. Snap beans, sugar beets and peas routinely lose 20 percent of their crop to soil-borne pathogenic fungi, many of which do not even have effective chemical controls. This is a significant loss to an agricultural sector that contributes more than \$700 million to Minnesota's economy by the time it is "value added" processed and packaged. Biological controls, tillage management, crop rotations, and the identification of disease resistant varieties are contributing to 35 percent yield increases in trials on some heavily infected fields.

Preventive and integrated weed management is addressed in several studies. For southern Minnesota, integrated and site specific weed management is aiming to cut herbicide use in half. In northern Minnesota, research on long-term herbicide reduction strategies is seeking to reduce weed control costs by 25 percent, about \$10 per acre, by looking at alternatives to the expensive current dominant controls: chemicals and soil disturbance (tillage).

Experiment Station Projects: MIN-13-017; MIN-13-020; MIN-13-049; MIN-13-054; MIN-13-078; MIN-13-079; MIN-13-G03; MIN-13-G06; MIN-17-022; MIN-17-032; MIN-14-034; MIN-17-037; MIN-17-042; MIN-17-046; MIN-17-049; MIN-17-050; MIN-17-052; MIN-17-057; MIN-17-065; MIN-17-066; MIN-17-067; MIN-17-069; MIN-17-G04; MIN-17-G08; MIN-17-G11; MIN-17-G12; MIN-22-018; MIN-22-033; MIN-70-044

<http://www.rapidresponse.umn.edu/Potato/fastbreeding2002-topic.html>

<http://www.rapidresponse.umn.edu/Potato/lateblight2002-topic.html>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1533>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1664>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1253>

<http://ipmworld.umn.edu/alert.htm>

- c. Funding: Hatch and State
- d. Scope of Impact: Multistate Research

Key Theme: Water Quality (Research)

AES Plans of Work: Goal 4:

Program 4: Sustainable Agriculture

Program 5: Water Resource Management

- a. Description

The Minnesota River is a major carrier of non point source pollution from southwestern and south central Minnesota to the Mississippi River. In St. Paul, where the Minnesota River joins the Mississippi River, the sediment load has averaged 625,000 tons per year in recent years. A 40 percent reduction in sediment load is necessary to achieve federally mandated water quality goals. Researchers are developing tillage and nutrient source strategies that are minimizing nonpoint source pollution impacts from surface and subsurface drainage systems in the Minnesota River Basin.

A new use of remote sensing data is also helping improve the quality of Minnesota's water.

Potato production in Minnesota is moving from the heavy clay soils of the Red River valley to glacial outwash regions of central Minnesota. With this change, there is a concern about the effects of current irrigation and nitrogen management practices on groundwater quality. Since 1996 research has been conducted in Minnesota outwash soils to evaluate the impact of techniques known to reduce nitrogen leaching

- b. Impact

Using data from a statewide feedlot inventory, researchers estimated the amount of nitrogen and phosphorus applied to agricultural land and then assessed the amounts in the Minnesota River that come from fertilizer versus land-applied manure. That information is being used to guide the development of state feedlot policy. The largest sources of nitrate pollution are fertilizers, followed by manure, atmospheric deposition, and urban point sources such as wastewater treatment facilities. This finding has led to more attention being focused on best management practices for nutrient management. Farmers can optimize their use of inputs without reducing production and make positive changes on Minnesota River quality. Another study used simulation modeling to estimate sediment reductions in the Minnesota River basin due to increased adoption of conservation tillage. Reductions in sediment ranged from 15 to 50 percent. Lower pollution levels will reduce money spent downstream to make Minnesota River water useable for human consumption, recreation and manufacturing.

Results of the research on potato fields have shown that surface drip, turkey manure, five splits of soluble nitrogen and deficient irrigation are some of the viable options for

reducing nitrogen leaching without significantly impacting tuber yield or quality. The information has been disseminated to producers and government agencies such as the Minnesota Pollution Control Agency. As a result, many producers in the area are now adopting the use of split application of nitrogen fertilizers. The results of the research have application to all types of outwash soils in the north central states.

Experiment Station Projects: MIN-14-089, MIN-25-034, MIN-25-020

- c. Funding: Hatch and State
- d. Scope of Impact: (1) State specific

Key Theme: Agricultural Waste Management (Joint)

AES Plan of Work: Goal 4

Program 6: Animal Waste Management

- a. Description

The Minnesota Agricultural Experiment Station and the University of Minnesota Extension Service each view the management of agricultural waste to be primarily an issue of animal waste management. This is in large part a function of the consolidation of livestock production into fewer but larger operations, coinciding with the sprawl of housing and non-agricultural land uses into traditional agricultural production areas.

- b. Impact

There are about 40,000 livestock producers in Minnesota. Building on previous work, Experiment Station funds were directed towards implementation of, in five chosen counties, OFFSET (Odor From Feedlots--Setback Estimation Tool) to establish appropriate setback distances for new or expanding animal production facilities. Even as a two-year project to validate initial observations is getting underway, preliminary results are being viewed with sufficient optimism that additional counties are beginning their own implementations.

The Experiment Station also conducted research assessing the impact manure storage facilities have on the quality of water beneath them, and on the quality of the air in vicinity around them. Results will provide livestock producers with qualitative evaluations of the various options available to them for reducing the risk of water or air pollution or contamination while maximizing the benefits that manure use as a soil amendment can provide.

Extension conducted 22 programs in the reporting year addressing animal waste management. One program addressed the composting of carcasses of dead animals. Conducted as part of a larger project to improve water quality in the Minnesota River

basin, it was attended by 165 people. With only limited additional contacts with the public, 19 farmers and 60 other individuals reported implementations of material presented.

All of the remaining Extension programs focused on aspects of feedlot and manure management. These 21 programs were attended by 6,929 individuals and these individuals were spread across 683 educational events. There were also 2,055 individual consultations with producers, and other agricultural professionals, communicating animal waste management information. There were 122 radio broadcasts from stations across the state addressing the project's goals, 7,333 publications distributed, 98 newspaper articles published, 61 newsletter articles written and distributed, in aggregate, to 51,280 people, and 10 related items posted to appropriate internet sites. These efforts resulted in 3,485 producers adopting new animal waste management practices in the reporting year.

Experiment Station Projects: MIN-12-062; MIN-12-076; MIN-12-082; MIN-25-055; MIN-25-082

<http://www.rapidresponse.umn.edu/odor/odor2001-topic.html>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1835>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1663>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=2008>

<http://www3.extension.umn.edu/mnimpacts/impact.asp?projectID=1779>

- c. Funding: Hatch and Smith-Lever
- d. Scope of Impact: Integrated Research and Extension

Key Theme: Rural Communities (Joint)

AES Plan of Work: Goal 5 – Empower people and communities, through research-based information and education, to address the economic and social challenges facing our youth, families, and communities.

Extension Plan of Work: Goal 5, Programs 2 and 3

- a. Description

The link between employment and housing has become a critical issue to many rural Minnesota communities. The lack of affordable housing can be a tremendous hindrance when trying to attract the necessary labor force for economic development and growth. Researchers have been examining several local housing policies in relation to economic and social issues that enhance rural community development. One of these is the difficult housing situation of seasonal, migrant workers.

Extension and research work has connected on several other issues related to rural community health, including regional economic development, rural tourism development, individuals' access to health care in rural communities, and development of local skills in facilitation for community problem-solving.

b. Impact

In addition to in-depth interviews and focus group discussion, local officials in small towns across the state were surveyed to determine the extent of local regulations influencing housing development and local government involvement in affordable housing development. A study of Minnesota communities with populations of 30,000 or less was conducted. Results revealed that nine out of ten communities had housing concerns and one out of every three of the communities needed additional housing to meet the demands of a growing workforce. The information is useful for policy makers and planners. For example, 38 communities have adopted policies that support developments that require open space with higher density housing. A migrant worker's housing survey was conducted in four Minnesota counties and is providing a basis for the development of a proposal to construct worker-owned housing for migrant agricultural workers. Research indicated that monthly housing costs for migrant workers average from \$90 to \$628 per person, and conditions vary widely. Poor housing conditions are often invisible to the majority of year-round community residents resulting in very little effort made at improving the situation. This research makes it visible.

Extension led Business Retention and Expansion programs have added an average of 26 jobs per community for each project undertaken. As these results are incorporated into the training programs for BR&E International and other groups, 1000 new communities will benefit from this improved knowledge. Potentially, this could translate into 26,000 jobs over a decade. One specific example of impact from a dairy BR&E project--74 community leaders in two counties in Minnesota visited 132 dairy farms to learn of their problems. Responding to the needs mentioned by farmers, a promotional effort was done through the local media to educate the public on the importance of the dairy industry. The community leaders also organized a conference to share information on financial assistance. The results: in total, they added 3,000 new cows to the region, reversing the previous downward trend.

Extension efforts to help rural families understand their health care options resulted the increase in one county from 4 families enrolled in Minnesota Care to over 50 families. Extension involvement in helping communities examine their housing needs has led to new housing being developed.

One county's effort to provide awareness of local and regional tourism destinations has resulted in workshops and a listing of local attractions that has been shared with clubs, organizations, schools and churches. The added traffic to local shops, parks, restaurants have given an economic boost to local communities. It has also provided families with a

Extension led community facilitation training has had specific impacts in several communities. For example, in one county, local discussion led to the addition of a cultural liaison position with the county, and the building of an ice arena in a community location determined by a consensus process. Two volunteer facilitators led an intervention between county law enforcement and mental health organizations after a complaint that the officers dealt poorly with mental health emergencies. The daylong session included over 90 law

enforcement officials and resulted in a strategy for better mental health interventions that was supported by the county Sheriff and two chiefs of police.

Experiment Station Projects: MIN-14-085, MIN-53-073, MIN-53-074

<http://www3.extension.umn.edu/projects/bre/>

<http://www.extension.umn.edu/mnimpacts/impact.asp?ProjectID=1654>

<http://www.extension.umn.edu/mnimpacts/impact.asp?ProjectID=1972>

- a. Funding: Hatch, State and Smith-Lever 3b & c
- b. Scope of Impact: (4) Integrated Research and Extension

Report on the stakeholder input process

A. Actions taken to seek stakeholder input that encourages their participation.

In October, 2001, the College of Human Ecology invited Black women leaders in Minnesota to a discussion/tea to talk about issues important in the African American community; about their perceptions of the College; and about their potential involvement in the College. As a result, Dr. Delores Henderson consented to participate in a newly formed CHE Advisory Council.

The CHE Advisory Council met in October 2001. The Advisory Council is made up of CHE alumni, national local community leaders who represent the diverse interests of the college. The council members also represent a diverse population. The outcome of their involvement is valuable advice and insight into the work and scholarship of the college and they serve as advocates for the college.

As part of a comprehensive internal planning process in the College of Human Ecology (CHE) in 2001, focus group meetings were scheduled and held throughout the state. The meetings included county commissioners, community leaders and members of the CHE legislative network. As an outcome of these meetings and the feedback solicited, CHE developed college wide initiatives to better knit together the abundant work being done by faculty in multiple departments in five core areas: nutrition and health, design and technology, cultural competence, economic and social well being, and development across the lifespan.

The Dean's Advisory Council in the College of Veterinary Medicine meets annually with the college's constituencies, including representatives from the poultry, swine, beef, dairy and equine industries. These meetings include updates from the college and updates on current status of the various commodity group issues and concerns. They also meet with each of these commodity groups several times each year to provide a current update. For example, they meeting with the Minnesota Turkey Growers' Association every other month as the Avian Pneumovirus (APV) Taskforce to discuss the current status of the disease outbreak, to update them on the status of the research, and to hear about issues and concerns in the state. Similar meetings take place with the swine industry with their disease concerns, which most recently is a new outbreak of PRRS (Procine Reproductive and Respiratory Syndrome) and with the cattle industry regarding Johne's disease. The college relies heavily on input from these commodity groups in responding to need and in designing research and responses.

In a newly created Multistate Research Project, Genetic and Functional Genomic Approaches to Improve Production and Quality of Pork, specific efforts will be made to reach under-served communities, for example, through the Southern Ag-Biotech Consortium for Under-served Communities (SACUC). This is a joint effort of 11 1890 institutions, industrial partners, governmental agencies, and farm organizations to promote agbiotech outreach to farmers and consumers and to strengthen K-Life science (biotech) education. NCAT, with M. Worku as campus coordinator, is a member of SACUC and will disseminate information from this NC project to under-served communities through educational outreach workshops, community outreach, and socio-economic studies in ag-biotechnology.

Research and Outreach Centers, associated with the College of Agricultural, Food, and Environmental Sciences, meet quarterly with constituent advisory councils to solicit input regarding relevance of research and outreach programs.

As part of its strategic planning process, the College of Agricultural, Food, and Environmental Sciences conducted listening sessions throughout Minnesota to engage citizens in identifying programmatic priorities.

Woodlands Wisdom, a confederation of six Tribal Colleges in the upper Midwest and the University of Minnesota, is addressing food-related health problems that threaten the Woodlands Tribes in Wisconsin, Minnesota and North Dakota. Members of this confederation provide valuable input and feedback to the Experiment Station and Extension service regarding needed research and outreach.

The Regional Sustainable Partnerships continue to provide input regarding and research and educational needs around the state. The Partnerships have established boards of directors and program development processes in five regions. These boards help guide Experiment Station and Extension priorities based on citizen's needs.

- B. Brief statement of the process used to identify individuals and groups who are stakeholders and to collect input from them.*

See *Section A* above.

- C. Statement of how the collected input was considered*

For research, the deans in the Colleges of Agricultural, Food and Environmental Sciences; Human Ecology; Natural Resources; Biological Sciences and Veterinary Medicine met as an Experiment Station Executive Council on a monthly basis to identify research trends, set research policy, plan programs, and discuss stakeholder input for inclusion in policy and planning decisions.

On the college level, the input is being used in strategic planning processes as well as in college "Compacts," which are required by the provost.

- D. Statement regarding the usefulness of the stakeholder input process in refocusing and reaffirming priorities or in identifying emerging issues.*

Stakeholder input will have direct input into the colleges' strategic planning processes. It will directly influence the use of resources and the direction of programs.

Update, if applicable, on the program review processes

There have been no significant changes in our program review process since the 5-year Plan of Work was submitted in 1999.

Evaluation of the success of multistate, multi-institution, and multidisciplinary activities, and joint research and extension activities

- **Success of multi-state, multi-institutional and multidisciplinary activities.**

Faculty in the Minnesota Agricultural Experiment Station participate in 132 multi-state projects and committees. These include NC [37], NCA [14], NCR [39], NCS [2], NE [13], NEC [1], NRSP [3], S [9], W [9], and WCC [5] projects. CRIS progress reports have been filed to document our participation in the projects. Participation in these projects by our faculty provided the opportunity to share resources across the North Central region and across the nation in some projects that had an interregional or national perspective.

Head Scab of Wheat and Barley

Faculty from four departments and two Research and Outreach Centers cooperate with faculty from Colleges of Agriculture from Land Grant Universities throughout the entire small grains growing region of the United States on research on head scab of wheat and barley. Research includes disease resistance breeding, epidemiology, and cultural disease management practices. Funds are provided from a USDA-CSREES national initiative on head scab.

Multidisciplinary Potato Research

Approximately 50 scientists from Minnesota, North Dakota, Michigan and Wisconsin are collaborating on multidisciplinary potato research. Faculty and graduate students from the four states met in April 2001 to identify research priorities and plan research in pest management, breeding, production, and post-harvest physiology. The group will meet again in April 2002. A North Central Technical committee has been formed from this group.

Agricultural Land Drainage

The College of Agricultural, Food, and Environmental Sciences at the University of Minnesota and the College of Agriculture at Iowa State University have initiated a cooperative agreement to collaborate on issues related to agricultural land drainage. As a part of the agreement, faculty from the two institutions who work on drainage and water quality issues meet at an annual conference to identify and discuss ongoing research issues and opportunities for collaboration.

- **Success of joint research and extension activities.**

The three projects listed above: Head Scab of Wheat and Barley; Quad State Potato Initiative; and MN/Iowa State land Drainage Initiative have an Extension component embedded in the project.

Regional Sustainable Partnerships

With funding from the Minnesota Legislature, the University of Minnesota has established five Sustainable Regional Sustainable Partnerships in southeastern, northeastern, central, northwest, and west central Minnesota. Each partnership includes a 13 to 15 member citizen committee from the region that identifies issues/concerns related to agriculture and natural resources. Legislative funds assigned to that region are used to engage the expertise and resources of the University of Minnesota to bring solutions to issues identified. Faculty and staff from the Minnesota Agricultural Experiment Station and the University of Minnesota Extension Service are members of the regional committees and also involved in collaborative work addressing the issues identified by the regional committees.

Research and Outreach Centers

The University of Minnesota has six Research and Outreach Centers located at Grand Rapids, Crookston, Morris, Lamberton and Waseca, Minnesota. University of Minnesota Extension Service District Directors are located at four of six of the Centers. Extension and Agricultural Experiment Station personnel have joint appointments are located at each center. The Centers have evolved from regional agricultural research experiment stations to community centers that serve as gateways to the University of Minnesota. Extension and research faculty and staff participate in field days on a multiple topics related to agricultural research and outreach and to social and policy issues related to supporting vital rural communities. The Centers provide ideal venues for addressing community concerns facing rural Minnesota while continuing their mandate to deliver research based results on agricultural and natural resource issues via the University of Minnesota Extension Service. Seamless collaboration of Extension and research personnel at the Centers has been crucial to the growing effectiveness of the Centers.

Tribal College Interaction

Extension and Agricultural Experiment Station faculty continue to meet with the White Earth Tribal College and White Earth Reservation officials to identify projects that would assist in addressing community and natural resource based issues and education of Native Americans. Issues have ranged from culture of wild rice, community health and nutrition, and one result of this partnership has led to the establishment of an environmental learning center. Most of the initial contacts with White Earth have developed through a W.K. Kellogg Foundation project called "Visions for Change". This project is one of thirteen sponsored by the Kellogg Foundation through its Food Systems Professionals Education Initiative. Increasing access to underserved populations is one of the objectives of "Visions for Change". Further collaboration and support of initiatives at White Earth Reservation by the Minnesota Agricultural Experiment Station and the University of Minnesota Extension Service is underway.

Interdisciplinary Centers

The College of Agricultural, Food and Environmental Sciences supports and participates in 12 interdisciplinary Centers with other colleges to bring focus on interdisciplinary issues confronting agriculture. In most instances multiple departments within the College participate in the centers. The centers are reviewed annually to ensure that the work is relevant and cutting edge. In each instance, Extension and research faculty work together to develop a continuum for effective flow of research based results to constituents via the Minnesota Extension Service.

Evaluation of the Success of Multi and Joint Activities

- Extension only

Reporting requirement for integrated research and extension activities, including Form CSREES – REPT (2/00)

In this accomplishment report, we reported on four joint themes with the University of Minnesota Extension Service. The Hatch dollars expended for these four themes totaled \$296,590, which is 27 percent of the total Hatch dollars reported in this report (\$1,095,398).

The actual dollars expended in FY 2001 for all Hatch projects integrated with Extension programs are documented on the attached CSREES-REPT (2/00) form.

As stated in the original Plan of Work, the University of Minnesota has an extensive list of faculty with joint appointments, including both research and outreach components (attached). This listing provides further evidence of the integrative efforts for federal funding at the University of Minnesota.

Finally, there are many other instances of programs initiating research and carrying through to dissemination through outreach in the Minnesota Impacts! database, which has been referenced throughout this document. The URL for the Impacts! website is: <http://www.extension.umn.edu/mnimpacts>.

FY 2001 FACULTY WITH JOINT APPOINTMENTS (RESEARCH/EXTENSION)

College of Agricultural, Food and Environmental Sciences
University of Minnesota

<u>DEPARTMENT</u>	<u>% Research</u>	<u>% Extension</u>	<u>% Teaching</u>
NWROC - CROOKSTON			
Macrae,Ian Vance	51%	49%	0%
Marx,George Donald	82%	18%	0%
Wiersma,Jochum J	52%	48%	0%
WCROC - MORRIS			
Johnston, Lee Jay	80%	20%	0%
Rudstrom, Margaretha	67%	33%	0%
NCROC - GRAND RAPIDS			
Erkkila, Daniel L	40%	60%	0%
Lamb, Graham Clifford	77%	23%	0%
Nyvall, Robert F	80%	20%	0%
SROC - WASECA			
Baidoo, Samuel K	80%	20%	0%
Fritz, Vincent A	70%	30%	0%
Zhu, Jun	80%	20%	0%
SWROC - LAMBERTON			
Nickel, I Pauline	55%	45%	0%
BIOSYSTEMS AND AGRICULTURAL ENGINEERING			
Jacobson, Larry Dean	25%	75%	0%
Janni, Kevin A	55%	45%	0%
Morey, R Vance	50%	25%	25%
Sands, Gary R	35%	65%	0%
Shutske, John M	25%	75%	0%
Wilcke, William F	25%	75%	0%
AGRONOMY AND PLANT GENETICS			
Becker, Roger Lee	25%	75%	0%
Durgan, Beverly R	26%	71%	3%
Gengenbach, Burle G	84%	15%	1%
Gunsolus, Jeffrey L	30%	70%	0%
Hicks, Dale Ray	8%	92%	0%
Peterson, Paul	25%	75%	0%
APPLIED ECONOMICS			
Buhr, Brian L	40%	40%	20%
Eidman, Vernon R	23%	25%	52%

Fruin,Jeremiah E	50%	50%	0%
Hurley,Terrance M	47%	49%	4%
Lazarus,William Frankl	20%	80%	0%
Levins,Richard Allen	16%	75%	9%
Morse,George Wilson	16%	75%	9%
Olson,Kent D	35%	25%	40%
Parliament,Claudia	20%	40%	40%
Stevens,Stanley C	15%	76%	9%
Stinson,Thomas F	46%	45%	9%
Taff,Steven James	25%	75%	0%
Welsch,Delane E	27%	30%	43%
ANIMAL SCIENCE			
DiCostanzo,Alfredo	17%	73%	10%
Linn,James	15%	75%	10%
Noll,Sally	15%	75%	10%
Poncedeleon,Frederico	65%	15%	20%
Seykora,Anthony	5%	26%	69%
Shurson,Gerald	5%	30%	65%
TBA, Beef	45%	55%	0%
ENTOMOLOGY			
Ascerno,Mark Jr	32%	37%	31%
Hutchison,William Dale	60%	40%	0%
Krischik,Vera	25%	75%	0%
Ostlie,Kenneth R	40%	60%	0%
Ragsdale,David Willard	59%	15%	26%
Spivak,Marla S	57%	14%	29%
COAFES - FOOD SCIENCE AND NUTRITION			
Addis,Paul B	40%	16%	45%
Feirtag,Joellen	3%	94%	3%
Schafer III,Henry W	2%	95%	3%
Warthesen,Joseph J	62%	7%	31%
HORTICULTURAL SCIENCE			
Erwin,John E	55%	45%	0%
Gardner,Gary M	20%	7%	73%
Hoover,Emily Esther	17%	24%	59%
Meyer,Mary H	15%	85%	0%
Tong,Cindy	41%	59%	0%
PLANT PATHOLOGY			
Jones,Roger Kent	20%	80%	0%
Pfleger,Francis L	8%	83%	9%
Powell,Jon F	70%	30%	0%
RHETORIC			

Wahlstrom,Billie J	40%	8%	52%
SOIL, WATER, & CLIMATE			
Anderson,James L	1%	89%	10%
Cheng,Hwei H	12%	22%	66%
Moncrief,John F	21%	79%	0%
Rehm,George W	18%	79%	3%
Robert,Pierre C	50%	30%	20%
Rosen,Carl Jay	21%	60%	19%
Schmitt,Michael A	20%	80%	0%
Seeley,Mark W	21%	79%	0%
Lamb,John Alexander	55%	20%	25%

Financial Data
INTEGRATED RESEARCH AND EXTENSION ACTIVITIES
UNIVERSITY OF MINNESOTA
AGRICULTURAL EXPERIMENT STATION
MINNESOTA EXTENSION SERVICE

PLAN OF WORK COMPONENTS

EXTENSION PROGRAMS	RESEARCH PROJECTS	HATCH
PLAN 1. An Agricultural System That is Highly Competitive in the Global Economy		
PROGRAMS:		
Ag. Prod. & Farm Bus. Mgmt.	12-027 Injury Prevention and Health Promotion Research for Production Agriculture	\$ 19,4
	12-076 Environmental and Air Quality Assessment and Control...	\$ 15,5
	12-092 Advanced Sensing & Control Technologies for Biological, Ag., & Food Engineering	\$ 14,1
	13-040 Commodities, Consumers, and Communities: Local Food Systems...	\$ 1,15
	14-022 Indicators of Financial Viability of MN Family Farms	\$ 49,3
	14-034 Profitability and Adoption of New Technology and Implications for...	\$ 6,30
	14-035 Management Info. Systems for Firms in Food Syst.	\$ 35,7
	14-045 Private Strategies, Public Policies, and Food System Performance	\$ 78,5
	14-056 Financing Agriculture and Rural America: Issues of Policy, Structure...	\$ 48,1
	14-057 An Economic Analysis of U.S. Livestock Sector Facing Demand...	\$ 64,6
Int. Ag. Competitiveness	14-064 Environmental & Trade Competitiveness Issues in Agriculture	\$ 54,1
	14-068 International Aspects of Intellectual Property Rights in Agriculture	\$ 40,5
Animal Prod. & Mgmt. Strategies	03-016 Methods to Increase Reproductive Efficiency in Cattle	\$ 6,00
	05-025 Management Systems for Improved Decision Making and Profitability...	\$ 8,8
	13-026 Forage Protein Characterization and Utilization for Cattle	\$ 56,1
	14-040 Economic Analysis Of Livestock Industry Marketing, Prices, Production & Policy	\$ 44,8
	14-055 Impacts of Structural Change in the Dairy Industry	\$ 34,8
	16-017 Advanced Technologies for the Genetic Improvement of Poultry	\$ 44,8
	16-018 Biophysical Models for Poultry Production Systems	\$ 92
	16-023 Identification of Recipient Genome for the Generation of Chicken...	\$ 51,0
	16-028 Genetic Enhancement of Health and Survival for Dairy Cattle	\$ 31,9

	16-034	Improving Turkey Production Performance	\$ 158,1
	16-042	Genetic Improvement of Cattle Using Molecular Genetic Information	\$ 64
	16-046	Regulation of Nutrient Use in Food Producing Animals	\$ 50,4
	16-050	Metabolic Relationships in Supply of Nutrients for Lactating Cows	\$ 31,1
	16-064	Evaluation of New Nutrition Technol. For Situation Depend. Diet Formulation in Swine	\$ 176,2
	16-080	Effect of Growth Factors on Proc. in Skeletal Muscle Growth...Meat Prod. Animals	\$ 36,7
	16-084	Molecular Mechanisms Regulating Skeletal Muscle Growth...	\$ 35,2
	16-087	Reproductive Performance of Turkeys	\$ 254,7
	60-015	Porcine Reproductive and Respiratory Syndrome (PRRS): ...	\$ 36,6
	62-037	Evolving Pathogens, Targeted Sequences, and Strategies for ...	\$ 20,9
	62-042	Use of Molecular Epidemiology to Describe the Clonal Diversity...	\$ 25,1
	62-043	Effect of Pasteurizing Waste Milk on Health and Performance in...	\$ 10,1
	63-032	Avian Respiratory Diseases: Pathogens	\$ 5
	63-056	National Animal Genome Research Program	\$ 20,5
	63-060	Control of Animal Parasites in Sustainable Agricultural Systems	\$ 16,6
	63-063	Positional and Functional Identification of Economically....	\$ 5,6
Crop Prod. & Mgmt. Strategies	12-028	Development of Machinery Systems..Site Spec. Farming	\$ 14,7
	13-019	Oat Breeding & Genetics	\$ 76,3
	13-020	Charaterizing Weed Population Variability for Improved...	\$ 159,2
	13-022	Molecular Cytogenetics in Plant Improvement	\$ 86,3
	13-030	Barley Breeding & Genetics	\$ 88,8
	13-033	Legumes in Cropping Systems	\$ 109,2
	17-032	Ecology and Management of European Corn Borer and Other...	\$ 55,8
	17-034	Management Strategies - European Corn Borer...	\$ 43,8
	17-042	Potato Insects: Biological and Cultural Control	\$ 49,5
	17-049	Management of Insects and Insect Vectors of Plant Pathogens...	\$ 19,5
	17-066	Biorational Methods for Insect Pest Management (IPM): ...	\$ 1,2
	17-067	Development of Pest Management Strategies for Forage...	\$ 11,6
	22-015	Genomics of Cyst Nematode Resistance in Soybean	\$ 20,2
	22-043	Plant Nematodes Inhabiting the Soils of a Portion of Minnesota's...	\$ 2,0
	22-079	Diagnosis, Epidemiology & Control of Plant Diseases...	\$ 23,2
	25-022	Assessing Nitrogen Mineralization and Other Diagnostic Criteria...	\$ 4
	25-064	Impact Climate and Soils on Crop Selection and Management	\$ 42,8
	25-083	Biogeochemistry and Ecological Risk Management of Trace....	\$ 49,3
	25-084	Improving Plant Nutrient Use Efficiency	\$ 156,0
	70-030	Molecular Analysis of Virulence Genes of Agro. Tumefaciens	\$ 31,5

	70-042	Enzymology of Forage Processing	\$ 3
Value-Added Agriculture	14-046	Competitiveness and Value-added Markets in the U.S. Grain...	\$ 27,7
	41-033	Growth and Succession in Forested Ecosystem Simulations	\$ 37,5
Green Industry	21-028	Postharvest Treatments to Prolong Fresh Fruit & Vegetable Shelf-life	\$ 20,3
	21-050	Genetics & Breeding of Floricultural Crops & Native Plant Species	\$ 41,7
	21-054	Biology and Utilization os Turfgrasses	\$ 52,0
	21-055	Breeding, Evaluation & Selection of Hardy Landscape Plants	\$ 114,1
	21-064	Molecular Analysis of Floral Gene Expression	\$ 41,6
	21-073	Freeze Damage and Protection of Horticultural Species	\$ 5
	21-082	Plant and Root Response to Environmental Stress	\$ 19,4
Food Crops	21-019	Develop Potato Varieties & Germplasm with Improved Yield, Stab., Qual....	\$ 66,8
		TOTAL HATCH DOLLARS - GOAL 1.	\$3,051,6
GOAL 2. A Safe and Secure Food and Fiber System			
	12-030	Improvement of Thermal and Alternative Processes for Foods	\$ 2,12
	18-018	Controlled Release of Encapsulated Food Flavor	\$ 38,9
	18-024	Physico Chemical Properties of Dairy Macromolecules in Food Systems	\$ 35,1
	18-039	Enhancing Food Safety Through Control of Food-Borne...	\$ 7,05
	18-054	Elimination of Escherichia Coli/Salmonellae from Ready-Consume Acid Fd	\$ 45,5
	18-055	In Vivo Regulatory Systems in Lactic Acid Bacteria....	\$ 36,3
	18-062	Application of Genetic Eng. Techniques for Dairy Starter Culture Improv.	\$ 111,1
	18-065	Structure/Function Relationships in Cereal Grains and Their...	\$ 9,8
	18-072	Physical Chemistry of Foods: Relationships of Water Activity...	\$ 40,1
	18-074	Eval., Improve. And Application of ATP Bioluminescence Tech....	\$ 36,0
	62-044	Development of Rapid Detection Method to Screen Generic Species...	\$ 16,9
		TOTAL HATCH DOLLARS - GOAL 2.	\$ 379,2
GOAL 3. A Healthy, Well-Nourished Population			
	14-044	Food Demand, Nutrition and Consumer Behavior	\$ 34,6

	18-023 Functional Foods: Fiber-and Antioxidant-Enriched Foods	\$ 24,000
	18-084 Studies on Secondary Oxidation of Various Lipids & Edible Fats In Vitro...	\$ 1,100
	54-026 Identification of Factors Predicting Consumption of Selec Diet Constituents	\$ 6,000
	54-029 Examination of Nutritional Status and Dietary Behavior for...	\$ 8,600
	54-034 Dietary Regulation os Sex Hormone Synthesis & Metabolism	\$ 3,000
	54-048 Quantification of Fatty Acid and Triglyceride Flux	\$ 4,000
	54-057 Factors Affecting Food Acceptability	\$ 14,000
	54-059 A Multicultural Investigation of Food as Medicine	\$ 9,200
	54-060 Rold of N-3/N-6 Polyunsaturated Fatty Acids in Health Maintenance	\$ 18,700
	54-064 Defining a Desirable Dietary Fiber Intake	\$ 5,100
	TOTAL HATCH DOLLARS - GOAL 3.	\$ 98,700
GOAL 4. An Agricultural System Which Protects Natural Resources and the Environment		
PROGRAMS:	13-067 Ecology of Diversified Grain Cropping Systems	\$ 14,400
Sustainable Agriculture	14-029 Decision Making for Ag. Firms Considering Risk & the Enrivot...	\$ 42,400
	14-073 Market-based Control of Environmental Quality	\$ 37,400
	22-074 Atmospheric Deposition: Trans. Vs. Local Air Pollutants...	\$ 11,500
	25-035 Management of Eroded Soils for Enhancement of Productivity...	\$ 13,000
Inc. & Main. Diversity in Ag. Syst		
Animal Waste Management		
Soil Nutrient & Water Management	12-040 Investigating Drainage Design and Management Alternatives for Meeting...	\$ 8,200
	14-089 Impact of Land & Water Mgmt. Decisions..MN's People & Env.	\$ 39,000
	25-034 Evaluation of Fertilizer & Irrigation Mgmt. Practices....	\$ 26,500
Imp. Water Quality in MN River...		
Sust. Nat. Res. Mgmt. & Steward..	17-068 Interactions Among Bark Beetles, Pathogens, and Conifers...	\$ 5,000
	22-069 Biology, Control, & Biotechnological Uses of Forest Microbes	\$ 54,800
	25-019 Reducing the Potential for Environmental Contamination by...	\$ 21,300
	25-020 Assessing Nitrogen Mineralization and Other Diagnostic Criteria....	\$ 2,700
	42-037 Remote Sensing Inputs to Inventory and Analysis of Natural Resources	\$ 27,500
	42-074 Net Primary Productivity and Carbon Sequestration Potential of...	\$ 27,500
	43-054 Assess. Of Changing Raw Material Needs & Life Cycle Env....	\$ 20,500

	43-068 Lignin Biosynthesis, Biodegradation & Derivative Plastics	\$ 51,0
Environmental Learning/Leadership		
Fisheries & Wildlife Habitat Mgmt.	41-074 Trophic Relations in Freshwater Systems	\$ 37,5
	41-078 Influence of Fisheries Management Practices on Genetic...	\$ 37,5
Nat. Res. Information Service		
	TOTAL GOAL 4.	\$ 474,1
GOAL 5. Enhanced Economic Opportunity and Quality of Life		
PROGRAMS:		
Fin. & Providing Public Services	53-070 Impact of Technology on Rural Consumer Access to Food and...	\$ 28,3
Leadership Development		
Business retention & Expansion...		
Tourism Dev.	53-065 Development of Interior Mat'l. Rating Syst. For Env. Conserv...	\$ 26,7
W-H/Youth Development	52-040 Family Systems and Family Realities	\$ 11,8
Urban and Rural Landscapes	42-046 Methods and Procedures for Benefits-based Management...	\$ 27,5
	52-049 Family Boundary Ambiguity in Alzheimer's Disease....	\$ 11,6
Personal & Family Health...	52-054 Decision Making Integral to Relationship-Ending Transitions	\$ 11,7
	52-055 Family Economic Well-Being: Self-Sufficiency Goals....	\$ 11,9
	52-066 Intergenerational Relationships in SE Asian Refugee Families	\$ 8,0
	52-073 Family Business: Work and Family Integration	\$ 10,7
	52-078 Rural Low-Income Families: Tracking Well-Being and...	\$ 7,4
	53-073 Housing, Neighborhood, and Community Environments of Low...	\$ 11,4
	55-035 Vital Involvement Practice: Promoting Life Strengths....	\$ 7,7
	55-036 Social Support, Social Networks, & Family Violence	\$ 7,0
	55-047 Professionalism Among Social Workers: Linkages.....	\$ 18,5
	55-048 Patterns of Adaptation & Acceptance of Hispanics in Am. Comm.	\$ 58,3
Ind. & Family Fin. Mgmt.	14-094 Rural Labor Market Behavior and Outcomes: The Role of Work...	\$ 23,1
	52-035 Family Buisness Viability in Economically Vulnerable Comm.	\$ 1,5
	52-077 Self-Employment: Economic Alter. To Support Hispanic	\$ 11,7
	TOTAL HATCH DOLLARS - GOAL 5.	\$ 295,7

	TOTAL HATCH DOLLARS -GOALS 1 THROUGH 5	\$4,284,0
al Expenditures - Data from FY 00/01 AD-419		
ort revised February 14, 2002		

**AREERA
FY 2000/2001 EXPENDITURES**

Goal / Theme	Hatch	MRF	McIntire Stennis	Animal Health	Special / Competitive	State Funds	Other Federal	Other Non-Federal	T F
Goal 1									
Plant Genomics	155,731	0	0	0	0	888,023	162,305	464,342	1,504,371
Environmental/Green Agriculture	197,481	0	0	0	0	897,666	16,079	263,038	1,264,164
Agricultural Profitability/Productivity	176,876	0	0	0	0	358,364	0	43,403	578,643
Animal Health	51,722	90,278	0	0	0	2,733,633	86,601	556,847	3,428,081
Goal 1 Total	581,810	90,278	0	0	0	4,877,686	264,985	1,327,630	7,069,501
Goal 2									
Food Quality, Food Safety	54,806	0	0	0	0	138,715	43,918	1,801	237,430
Goal 2 Total	54,806	0	0	0	0	138,715	43,918	1,801	237,430
Goal 3									
Human Nutrition	29,664	0	0	0	53,003	432,372	138,504	218,006	838,545
Goal 3 Total	29,664	0	0	0	53,003	432,372	138,504	218,006	838,545
Goal 4									
Forest Resource Management	90,509	30,133	269,182	0	0	2,438,506	1,366,166	774,439	4,678,335
Integrated Pest Management	197,682	126,065	0	26,954	148,438	1,857,658	562,669	1,023,928	3,815,727
Water Quality	68,401	0	0	0	0	484,708	222,316	213,478	988,903
Cultural Waste Management	19,936	47,191	0	0	0	805,162	11,385	751,346	1,673,624
Goal 4 Total	376,528	203,389	269,182	26,954	148,438	5,586,034	2,162,536	2,763,191	11,172,130
Goal 5									
Rural Communities	52,590	991	0	0	0	101,037	0	70,123	224,740
Goal 5 Total	52,590	991	0	0	0	101,037	0	70,123	224,740

Grand Total	1,095,398	294,658	269,182	26,954	201,441	11,135,844	2,609,943	4,380,751	20,000,000
--------------------	------------------	----------------	----------------	---------------	----------------	-------------------	------------------	------------------	-------------------

NEERA FY 2001 DETAIL OF EXPENDITURES

Theme	Project	Hatch	MRF	McStennis	An Hlth	S/C Grant	State	Other Fed	Other Non-Fed	Total
Economics	21-066						372,595	47,493	39,597	459,685
	13-030	88,860					301,098	61,584	191,745	581,587
	21-019	66,871					214,330	53,228	233,000	504,329
		155,731	0	0	0	0	888,023	162,305	464,342	1,514,670
Rural/Green Agriculture	21-060						170,881	14,560	13,638	199,079
	21-050	41,725					265,686		103,558	411,069
	21-055	114,136					272,349		145,602	432,087
	21-064	41,620					188,750	1,519	240	190,509
		197,481	0	0	0	0	897,666	16,079	263,038	1,277,184
Rural Profitability/Productivity	12-028	14,716					137,915		7,753	160,384
	14-022	49,330					59,144		1,652	109,126
	14-052						65		33,998	34,063
	14-056	48,177					74,027			122,204
	14-057	64,653					87,213			151,866
		176,876	0	0	0	0	358,364	0	43,403	401,767
Health	16-028		31,973				506,319		195,668	702,950
	16-047						681,926		282,789	964,715
	17-023						117,727	86,601	78,390	282,718
	60-009						98,143			98,143
	60-015	9,557	27,095				26,082			62,734
	62-037	6,892	14,023				513,959			524,874
	62-042	25,117					183,144			208,261
	62-043	10,156					199,336			209,492
	63-032		549							549
	63-060		16,638				122,151			138,789
	63-062						284,846			284,846
		51,722	90,278	0	0	0	2,733,633	86,601	556,847	3,378,381
	Total		581,810	90,278	0	0	0	4,877,686	264,985	1,327,630
Quality, Food Safety	18-042	9,269					2,961		258	12,488
	18-054	45,537					135,754	43,918	1,543	185,752
Total		54,806	0	0	0	0	138,715	43,918	1,801	199,230

Theme	Project	Hatch	MRF	McStennis	An Hlth	S/C Grant	State	Other Fed	Other Non-Fed	Total
Nutrition	18-023	247					69,555		25,421	
	54-026	6,000					68,151	131	10,536	
	54-029	8,660					87,774		7,160	
	54-034	367					79,387	138,373	7,887	
	54-059	9,227					35,810			
	54-064	5,163					91,695		167,002	
	54-G05						53,003			
	Total		29,664	0	0	0	53,003	432,372	138,504	218,006
Resource Management	14-077	25,464	30,133				7,334		13,576	
	17-018						30,819			
	17-070									
	40-015						786,560			
	41-033	37,527					171,497			
	41-036									
	42-020						73,378	794,643	406,133	1,2
	42-022			68,858			80,692	55,434	57,395	2
	42-032						139,879	29,116	17,154	2
	42-040				45,959		117,563		38,682	2
	42-042				17,266		49,663	10,826	2,923	2
	42-044				48,615		155,031	269,299	1,981	4
	42-045				37,538		118,180	78,015	2,100	2
	42-046	27,518					187,761	89,226	35,157	3
	42-049				28,605		24,341			
	42-070						319,480		187,051	5
42-086						168,186	35,366	9,924	2	
42-089				22,341		8,142	4,241	2,363	2	
Total		90,509	30,133	269,182	0	0	2,438,506	1,366,166	774,439	4,9
Pest Management	13-017						154,844	8,772	162,807	3
	13-020	91,773	67,474				165,031		58,016	3
	13-049						92,176	8,580	61,587	2
	13-054						54,669		59,127	2
	13-078							55,671		
	13-079						170,571	11,274	68,350	2
	13-G06						34,445			
	17-022									
	17-032	10,670	45,217				122,450		32,295	2
	14-034	6,301					51,637		18,618	
	17-037						116,922		62,089	2
	17-042	49,585					174,381		81,344	3
	17-046						95,375	39,335	44,484	2
	17-049	19,503					122,862	14,069	115,353	2
	17-050					26,954	113,412		11,146	2
17-052			413							
17-057						116,670	242,387		3	

Theme	Project	Hatch	MRF	McStennis	An Hlth	S/C Grant	State	Other Fed	Other Non-Fed	Total
	17-065						116,155	21,325	194,834	3
	17-066		1,268							
	17-067		11,693				12,877		9,974	
	17-069									
	17-G04					38,331	7,045		10,192	
	17-G08					36,133	9,665		10,322	
	17-G11					39,529				
	17-G12									
	22-018	19,850					139,484	161,256	19,924	3
	22-033						8,749		3,466	
	70-044						12,683			
		197,682	126,065	0	26,954	148,438	1,857,658	562,669	1,023,928	3,928
Quality	14-089	39,079					143,590	23,174	49,628	2
	25-034	26,599					116,726	57,865	29,797	2
	25-020	2,723					224,392	141,277	134,053	5
		68,401	0	0	0	0	484,708	222,316	213,478	9
Local Waste Management	12-062						272,569		75,726	3
	12-076	15,564					194,517		27,402	2
	12-082	4,372	47,191				253,503	11,385	615,260	9
	25-055									
	25-082						84,573		32,958	1
		19,936	47,191	0	0	0	805,162	11,385	751,346	1,028
Total		376,528	203,389	269,182	26,954	148,438	5,586,034	2,162,536	2,763,191	11,928
Communities	14-085	41,104	991				40,800		69,493	1
	53-073	11,486					60,237		630	
	53-074									
Total		52,590	991	0	0	0	101,037	0	70,123	1
Total		1,095,398	294,658	269,182	26,954	201,441	11,135,844	2,609,943	4,380,751	20,927

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multistate Extension Activities and Integrated Activities
(Attach Brief Summaries)

	University of Minnesota							
	Minnesota							
Category:		Multistate Extension Activities						
	X	Integrated Activities (Hatch Act Funds)						
		Integrated Activities (Smith-Lever Act Funds)						
					Actual Expenditures			
Planned Program/Activity					FY 2000	FY 2001	FY 2002	FY 2003
					\$1,509,210	\$3,051,628		
					291,982	379,236		
					88,621	98,731		
					508,025	474,188		
					189,992	295,702		
					\$2,587,830	\$4,284,038		
REES-REPT (2/01)								

						Director		
--	--	--	--	--	--	-----------------	--	--

